

REMARKS

Attached hereto is a marked-up version of the changes made to the claims by the current amendment.

A new independent claim 17 and claims 18 - 20 depending therefrom have been added. Claims 1 - 20 are pending in the application with claims 1 - 5 being withdrawn from further consideration on the merits as being drawn to a non-elected invention and claims 6 - 20 being considered on the merits.

In the Office Action, it is noted that Applicants have made a provisional election to prosecute the invention of Group II, claims 6 - 16. Applicants hereby affirm this provisional election.

Also, in the Office Action, claims 6 - 16 are rejected under 35 U.S.C 103(a) as being unpatentable over US Patent No. 4,653,732 to Wunning et al. Applicants respectfully traverse the rejections of claims 6 - 16 in view of the following comments.

Claim 6 of the present application recites an apparatus for the thermal treatment of metallic workpieces comprising a quenching chamber for receiving preheated workpieces and a quenching gas for cooling same. The apparatus also comprises guide channels for a directed flow of quenching gas about the workpieces, wherein the guide channels have a closed lateral surface and surround the workpieces along a direction of flow of the quenching gas.

The guide channels recited in claim 6 of the present application advantageously guide the quenching gas in an individual manner around each workpiece in a substantially laminar flow which promotes intense and uniform quenching of the workpieces. Since each workpiece to be quenched is enclosed by

a respective one of the guide channels, the directed flow of quenching gas flowing through the respective guide channel cannot generate turbulence with the directed flows of quenching gas flowing through the adjacent guide channels.

The double-chamber vacuum furnace disclosed in US Patent No. 4,653,732 to Wunning et al comprises, in one embodiment thereof illustrated in Figure 5, a particular furnace charge and nozzle arrangement operable to quench a charge 11a consisting of a plurality of cylindrical workpieces 30. A horizontal nozzle plate 20 is inserted in the nozzle box 18 above the charge 11a and supports nozzle openings 35 in an even distribution over its entire surface.

Applicants submit that US Patent No. 4,653,732 to Wunning et al neither teaches nor discloses the apparatus recited in claim 6 of the present application. For example, US Patent No. 4,653,732 to Wunning et al provides no hint to one of skill in the art of the desirability of guide channels surrounding the workpieces along a direction of flow of the quenching gas, let alone any hint of the desirability of guide channels having a closed lateral surface and surrounding the workpieces along a direction of flow of the quenching gas.

As noted, since the inventive arrangement advantageously guides the quenching gas in an individual manner around each workpiece in a substantially laminar flow, the directed flow of quenching gas flowing through each respective guide channel cannot generate turbulence with the directed flows of quenching gas flowing through the adjacent guide channels. In contrast, in the quenching structure disclosed in US Patent No. 4,653,732 to Wunning et al, the quenching gas flowing through the nozzle openings 35 in the nozzle plate 20 does not flow in a substantially laminar manner for the reason that each flow of quenching gas is free to mix with,

and be contacted by, the flows of quenching gas being introduced via the adjacent nozzle openings 35. Thus, it can be readily appreciated that the nozzle openings arrangement disclosed in US Patent No. 4,653,732 to Wunning et al produces turbulent, non-laminar flows around the workpieces to be quenched.

Accordingly, it is submitted that the apparatus of the present invention, as recited in claim 6, is neither taught nor disclosed by the prior art of record and, additionally, it is submitted that the apparatus respectively recited in claims 7 - 16, which each ultimately depend from claim 6, are also neither taught nor disclosed by the prior art of record for at least the reasons as set forth with respect to claim 6. Reconsideration of the rejection of claims 6 - 16 under 35 U.S.C. Section 103(a) is therefore respectfully requested.

Applicants have also submitted herewith a new independent claim 17 and claims 18 - 20 depending therefrom. New independent claim 17 of the present application recites an apparatus for the thermal treatment of metallic workpieces comprising a quenching chamber for receiving preheated workpieces and a quenching gas for cooling same. The recited apparatus also comprises means for guiding individual substantially laminar flows of quenching gas around the workpieces in a manner such that each respective individual flow of quenching gas around a respective one of the workpieces remains out of contact with the other respective individual flows of quenching gas during its flow around the respective workpiece, wherein each individual flow of quenching gas is substantially laminar due to the absence of turbulence-generating mixing which would otherwise occur if the flows of quenching gas were not prevented from mixing with one another. The means for guiding individual substantially laminar flows of quenching gas includes a

plurality of guide channels each having a closed lateral surface and being disposable in surrounding relationship around a respective one of the workpieces for directing a substantially laminar flow of quenching gas around the respective workpiece.

It is submitted that new independent claim 17, and claims 18 - 20 depending therefrom, patentably define over the prior art of record. For example, US Patent No. 4,653,732 to Wunning et al does not teach or disclose the feature recited in claim 17 of "means for guiding individual substantially laminar flows of quenching gas around the workpieces in a manner such that each respective individual flow of quenching gas around a respective one of the workpieces remains out of contact with the other respective individual flows of quenching gas during its flow around the respective workpiece, wherein each individual flow of quenching gas is substantially laminar due to the absence of turbulence-generating mixing which would otherwise occur if the flows of quenching gas were not prevented from mixing with one another." Instead, as noted above, US Patent No. 4,653,732 to Wunning et al discloses a quenching arrangement in which quenching gas is introduced in a manner such that there occurs turbulence due to the contact between adjacent flows of quenching gas.

Applicants submit that claims 6 - 20 are now in condition for allowance and that non-elected claims 1 - 5 should now be considered and early action toward these ends is respectfully requested.

However, should the Examiner have any further comments or suggestions, the undersigned would very much welcome a telephone call in order to resolve any

outstanding issues and expedite placement of the application into condition for allowance.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Robert - Becker".

Robert W. Becker, Reg. No. 26,255
for applicant(s)

ROBERT W. BECKER & ASSOCIATES
707 Highway 66 East, Suite B
Tijeras, NM 87059

Telephone: (505) 286-3511
Facsimile: (505) 286-3524

RWB:mac

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

17. (New) An apparatus for the thermal treatment of metallic workpieces, said apparatus comprising:

a quenching chamber for receiving preheated workpieces and a quenching gas for cooling same; and

means for guiding individual substantially laminar flows of quenching gas around said workpieces in a manner such that each respective individual flow of quenching gas around a respective one of said workpieces remains out of contact with the other respective individual flows of quenching gas during its flow around the respective workpiece, wherein each individual flow of quenching gas is substantially laminar due to the absence of turbulence-generating mixing which would otherwise occur if the flows of quenching gas were not prevented from mixing with one another, said means for guiding individual substantially laminar flows of quenching gas including a plurality of guide channels each having a closed lateral surface and being disposable in surrounding relationship around a respective one of said workpieces for directing a substantially laminar flow of quenching gas around the respective workpiece.

18. (New) An apparatus according to claim 17, wherein said guide channels have a length that corresponds at least to a height of individual or stacked ones of said workpieces.

19. (New) An apparatus according to claim 18, wherein the length of said guide channels projects beyond a height of said individual or stacked workpieces by an amount equal to half of a diameter or width of said workpieces.

20. (New) An apparatus according to claim 17, which includes means for displacing said guide channels in said quenching chamber.